AD NUMBER

AD-B013 131

NEW LIMITATION CHANGE

TO **DISTRIBUTION STATEMENT - A**
Approved for Public Release; Distribution Unlimited.

LIMITATION CODE: 1

FROM **DISTRIBUTION STATEMENT - B**
Distribution limited to U.S. Gov't. agencies only; Proprietary Info., Other requests shall be referred **to US Army Command & General Staff College Fort Leavenworth, KS 66027.**

AUTHORITY

Mr. Ed Burgess, Archives Manager, U.S. Army Command and General Staff College, Ft. Leavenworth, KS. July 21, 1999.

(2) (6)

Tactical Control Measures on the High Technology Battlefield - A Study of Unit Lateral Boundaries in the Forward Defense of Europe.

(10) Peter Dwight/Burgess, MAJ, USA
U.S. Army Command and General Staff College
Fort Leavenworth, Kansas 66027

(9) Final report, (11) 11 Jun 76

(12) 88 p.

A Master of Military Art and Science thesis presented to the faculty of the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER
2. GOVT ACCESSION NO.
3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)
Tactical Control Measures on the High Technology Battlefield - A Study of Unit Lateral Boundaries in the Forward Defense of Europe

5. TYPE OF REPORT & PERIOD COVERED
Final Report 11 Jun 76

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)

8. CONTRACT OR GRANT NUMBER(s)

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Student at the U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS
U.S. Army Command and General Staff College
ATTN: ATSW-SE

12. REPORT DATE
11 Jun 76

13. NUMBER OF PAGES
78

14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)

15. SECURITY CLASS. (of this report)
Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)
27 AUG 1976
Distribution limited to U.S. Government agencies only: Proprietary Information. Other requests for this document must be referred to U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES
Master of Military Art and Science (MMAS) Thesis prepared at CGSC in partial fulfillment of the Masters Program requirements, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas 66027.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

See reverse.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

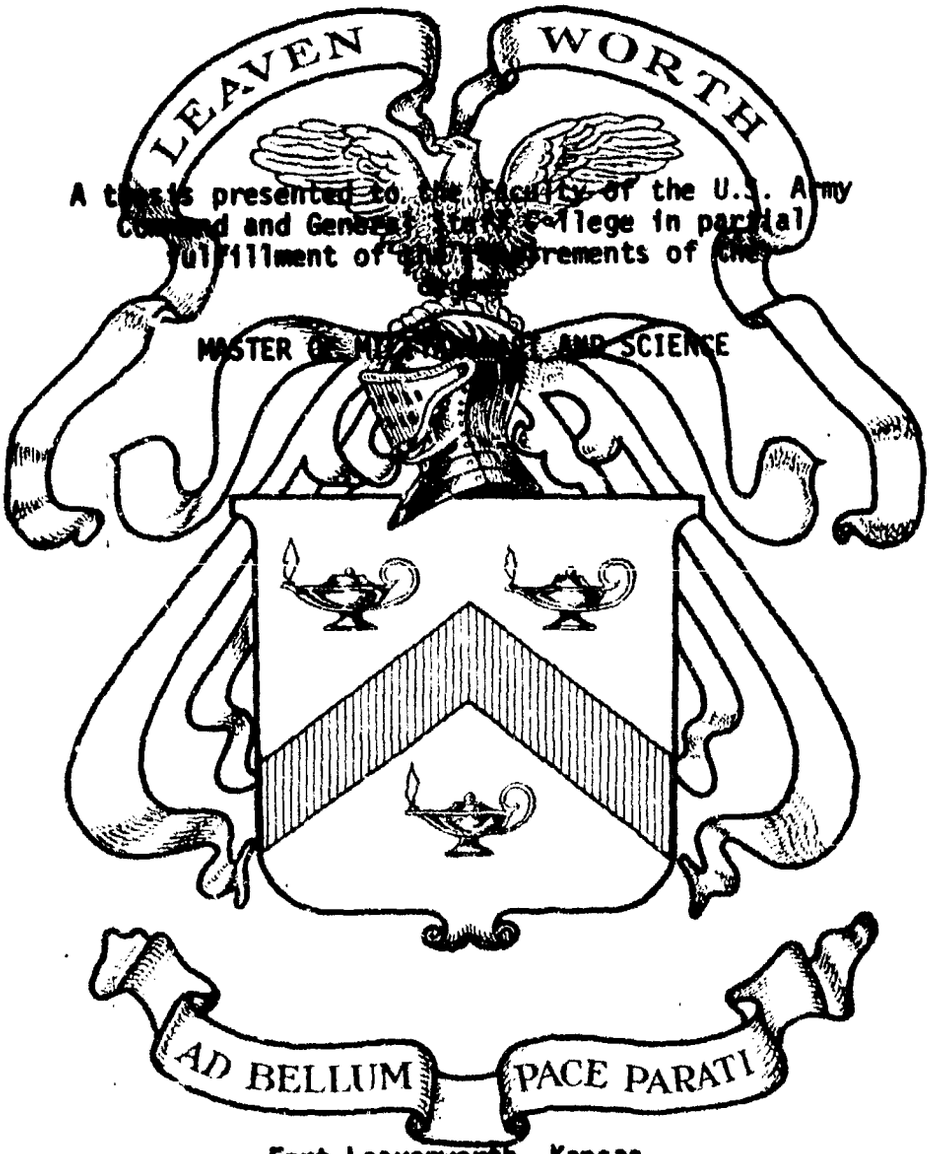
UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

If the United States expects to win a land war in Europe against the Soviet Union, the Army must be prepared to fight on the high technology battlefield. Every battle practice in our existing doctrine needs critical examination to assure technological advances in weapon systems are used to the greatest advantage. Available combat power is wasted when inadequately applied in accordance with doctrine derived from the existence of a graphic control measure, the lateral boundary.

To study the influence of maneuver unit lateral boundaries on combat effectiveness, a methodology was developed which enabled qualified professional wargamers to play two scenario driven games simultaneously, thereby avoiding the bias injected by iterative gaming. Analysis and wargaming indicated that tacticians derived rules from the availability of lateral boundaries which do not adequately support current defensive concept.. Deleting lateral boundaries invalidates the tactician's boundary rules, creating a confusing void in doctrine.

It is concluded that the doctrinal void is costly and should be filled immediately by new rules which enable combat superiority from the improvements in weapon system technology. Further, the Army should commence a vigorous program to train maneuver units how to fight using a new generation of rules.

TACTICAL CONTROL MEASURES ON THE HIGH TECHNOLOGY BATTLEFIELD - A STUDY OF UNIT LATERAL BOUNDARIES IN THE FORWARD DEFENSE OF EUROPE



A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements of the

MASTER OF MILITARY ART AND SCIENCE

Fort Leavenworth, Kansas
1976

51.5-3150

TACTICAL CONTROL MEASURES ON THE HIGH TECHNOLOGY BATTLEFIELD - A STUDY OF UNIT LATERAL BOUNDARIES IN THE FORWARD DEFENSE OF EUROPE

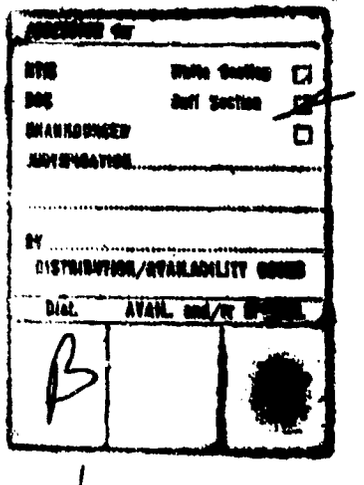
A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements of the degree

MASTER OF MILITARY ART AND SCIENCE

by

PETER DWIGHT BURGESS, MAJ, USA
B.S., United States Military Academy, 1961
M.P.A., University of Missouri, 1974
M.S., American Technological University, 1975

Fort Leavenworth, Kansas
1976



MASTER OF MILITARY ART AND SCIENCE

THESIS APPROVAL PAGE

Name of candidate Peter Dwight Burgess, MAJ, USA

Title of thesis Tactical Control Measures on the High Technology Battlefield - A Study of Unit Lateral Boundaries in the Forward Defense of Europe

Approved by:

, Research Advisor

, Member, Graduate Research Faculty

, Member, Consulting Faculty

Accepted this 1st day of June 1976 by
Director, Master of Military Art and Science.

The opinions and conclusions expressed herein are those of the individual student author and do not necessarily represent the views of either the US Army Command and General Staff College or any other governmental agency.

ABSTRACT

If the United States expects to win a land war in Europe against the Soviet Union, the Army must be prepared to fight on the high technology battlefield. Every battle practice in our existing doctrine needs critical examination to assure technological advances in weapon systems are used to the greatest advantage. Available combat power is wasted when inadequately applied in accordance with doctrine derived from the existence of a graphic control measure, the lateral boundary.

To study the influence of maneuver unit lateral boundaries on combat effectiveness, a methodology was developed which enabled qualified professional wargamers to play two scenario driven games simultaneously, thereby avoiding the bias injected by iterative gaming. Analysis and wargaming indicated that tacticians derived rules from the availability of lateral boundaries which do not adequately support current defensive concepts. Deleting lateral boundaries invalidates the tactician's boundary rules, creating a confusing void in doctrine.

It is concluded that the doctrinal void is costly and should be filled immediately by new rules which enable combat superiority from the improvements in weapon system technology. Further, the Army should commence a vigorous program to train maneuver units how to fight using a new generation of rules.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Background to the Problem

The United States Army in Europe is committed to a forward defense of West German territory.[1] Adherence to the concept of forward defense minimizes the defenders' option of trading space for time. Concomitantly, position and mobile defense tactics are rendered invalid against an attack by Soviet forces.[2] The Soviets and their Warsaw Pact allies can so outnumber and outgun the United States ground forces in Europe, that unless commanders can accurately forecast the time, place, and strength of an attack, and move boldly to block it; momentum will carry the attack to an early breakthrough of corps combat units.[3] Failure to stop a major penetration with conventional forces invites the option of nuclear war.

Doctrine developed in 1975 by the United States Army Training and Doctrine Command (TRADOC) is designed to stop a major Soviet attack before its momentum carries it to a breakthrough penetration.[4] To implement TRADOC doctrine, the defending commander must be provided whatever intelligence is available to pinpoint the area threatened by a main attack, confirm this intelligence in the covering force area, recognize the potential penetration, and move forces to block the attack. The defending commander accepts great risk in other portions of his sector by moving lightly committed or uncommitted units laterally to reinforce his critical area and block the attempted penetration.[5]

A two division Soviet breakthrough penetration can be expected to develop on a front approximated by the sector defended by one United States Army brigade.[6] While engaged decisively, this brigade receives several reinforcing battalion task forces: thereby straining command and control capabilities already under severe stress. The brigade commander's command and control of decisively engaged subordinate units is stressed by platoon, company, and battalion units in constant movement among defensive positions; a tactic designed to wear down the attacker's momentum while adding depth to the brigade defense.[7]

A brigade commander's ability to command and control the combat power of subordinate and supporting units engaged in the tactics of TRADOC doctrine is unknown and untested.[8] Some authorities postulate that lateral boundaries for battalion and company units of a brigade fighting a Soviet breakthrough penetration should cause a loss in combat effectiveness.[9]

Others insist that lateral boundaries must be employed between defending company and battalion maneuver units to describe sectors wherein forces have freedom to conduct their defense.[10]

This thesis will attempt to determine if the requirement for boundaries as described in previously published doctrine[11] remains valid in the light of current military art and science; given antiarmor tactics for the forward defense of West Germany by the United States Army in 1976.

The following specific questions will be researched:

a. Are lateral boundaries at company level required and practicable?

b. Are lateral boundaries at battalion level required and practicable?

A portion of TRADOC antiarmor doctrine critical to command and control of units fighting a brigade defense will be tested by the research.

Rationale for Concern

Although generals must move uncommitted or lightly committed battalions from throughout the corps to reinforce one brigade facing a breakthrough penetration, and although the colonel must direct the brigade battle with as many as eight, nine or ten battalion task forces and massive fire support committed in sector against all or part of two massed Soviet divisions, it is the companies of the battalion task forces that fight the enemy. Depth of combat is achieved by maneuver through prepared company team blocking positions. Companies fight as cross-reinforced teams whenever possible.[12]

The company fight is characterized by cross-reinforced units moving in depth throughout the brigade sector to whichever blocking position must be occupied to kill attacking forces. Company teams must be able to vacate blocking positions in fifteen minutes when ordered to displace.[13]

Even if the generals and colonels have done their jobs properly so that the captain can defend with a three to one disadvantage, if the captain is to win, he must be provided every tactical advantage to command and control his fighting unit.[14]

The question causing concern is whether lateral boundaries provide the fighting unit a tactical advantage or whether they detract from combat effectiveness. The correct answer to this question should influence the outcome of battle.

Previous Military Studies

Previous military studies examining the requirement for lateral unit boundaries remain unlocated. Use of lateral boundaries as part of military art and science appears to have continued without question.

Previous Academic Studies

Behavioral scientists have contributed theories concerning territoriality and the development of rules; theories which tangentially address the idea of boundaries.[15] These studies appear overly broad in scope to contribute significantly to the resolution of the problem as stated. It is felt that these studies will help to frame a conceptual scheme for analysis.

Statement of the Problem

The thesis problem is to investigate and determine through an assessment of current military art and science whether lateral boundaries at company and battalion level should be used

by the United States Army in the defense of Western Europe against a Soviet attack.

Objectives

To answer the problem the following tasks must be accomplished.

1. Determine the function of unit lateral boundaries.

2. Determine the advantages gained from unit lateral boundaries.

3. Determine disadvantages imposed by unit lateral boundaries.

4. Determine the defender's ability to emplcy unit lateral boundaries given the tactical concept envisioned by TRADOC doctrine for defense against a Soviet breakthrough penetration in Europe.

5. From the above determinations decide whether unit lateral boundaries at company and at battalion should be used.

Methodology

The specific frame of reference for research is the current status of military art and science as defined by TRADOC doctrine (1975-1976) for the defense of Europe.[16] Research methods will include:

a. Personal interviews with specialists in European defense located at TRADOC schools and centers.

b. Library research of facts and details.

c. A terrain model wargame conducted by professional

wargamers to achieve simultaneous evaluation of two situations:

1. With unit lateral boundaries.
2. Without unit lateral boundaries.

Scope of the Study

Necessary Assumptions:

a. That a US Corps in West Germany is attacked by Soviet forces attempting to break through the corps defense by penetrating on a narrow front.

b. That the width of Soviet penetration approximates one defending brigade's sector, approximately ten kilometers.

c. That units from other brigades and other divisions move laterally into the threatened brigade sector, are attached to that brigade, and reinforce the defense.

d. That the brigade defends well forward, keeping little or no reserve; positioning subordinate units where they can concentrate firepower against enemy targets.

e. That depth of combat is achieved by maneuvering platoons and company teams between prepared blocking positions throughout the brigade sector.

f. That the battlefield is characterized by constant small unit maneuver and by the use of tank and antitank weapons systems concentrated on the most threatened part of the brigade sector.

Limitations

The study will examine company and battalion lateral boundaries for their impact on the ground units of the combined arms team; infantry, armor and field artillery.

The study will be limited to unclassified data.

The study will not address control measures for uncommitted or lightly committed units, nor does it address prehostility control measures. The study will be limited to the situation in that part of the division main battle area occupied by one brigade defending against all or the greatest part of a Soviet breakthrough penetration.

Nuclear warfare will not be a consideration.

Definitions

Covering force area.

The territory occupied by defending forces described to the front by land under hostile control and to the rear by the forward edge of the battle area (FEBA).[17]

Main battle area.

The territory occupied by defending forces described to the front by the FEBA and to the rear by the rear boundary of largest subordinated combat unit.[18]

Forward defense.

A concept which allows the very minimum exchange of defended territory for the purpose of gaining time.[19]

Breakthrough Penetration

A tactic used by attacking Soviet forces characterized by massing on a front of approximately ten kilometers with two divisions followed by two more divisions in a second echelon and two more in a third echelon. The intent of this tactic is to mass forces for a short period, penetrate the defense by sustained assault, and exploit the penetration in the defender's vulnerable rear area.[20]

Chapters in the Study

Chapter II describes the unit lateral boundary, interests of combat and combat support branches in use of lateral boundaries, gains accrued from use of lateral boundaries, and rules formulated for the use of lateral boundaries. The chapter also discusses the lateral boundary in relationship to weapons systems on the battlefield of the 1975-1976 period.

Techniques for creating and using lateral boundaries are critically analyzed in the third chapter. Lateral boundaries at company and battalion are compared, and small unit tactics at company and battalion are examined in detail. The lateral boundary's relationship to TRADOC's antiarmor doctrine is illustrated through its support or detraction from command and control of company and battalion units in combat.

Chapter IV contains a detailed description and analysis of a wargame conducted to assess the ability of key

representatives of the combined arms team to defend against a breakthrough attack both with and without unit lateral boundaries.

The final chapter summarizes the findings of this thesis and offers conclusions based on the facts presented. The final section of this chapter contains suggestions for future studies.

CHAPTER II

THE LATERAL BOUNDARY

Description of the Unit Lateral Boundary

The lateral boundary is a graphic control measure which in conjunction with a rear boundary partitions a battlefield into sections, thereby describing a zone of action or sector of responsibility for a tactical force.

Interests of Combat and Combat Support Branches in Use of Lateral Boundaries

The combat branches are trained to defend within sectors, to fire and maneuver within lateral boundaries, and to engage the enemy on terrain described by these control measures. The "sector", once described, becomes the responsibility of one commanding officer with freedom to fight his unit knowing other friendly forces will not impinge on the territory assigned to his unit without his consent. Given lateral boundaries, a commander does not fire into nor maneuver into an adjacent unit's sector without approval from the adjacent unit commander.[21]

Combat support branches, field artillery, air defense artillery, engineers, military police and signal corps, use supported unit lateral boundaries to define relationships and responsibilities

to ground combat units.[22] The field artillery will answer calls for fire from observers located with combat units. The field artillery is very doctrinaire in its insistence that it will fire across unit lateral boundaries only by permission from the unit across the lateral boundary within whose sector the target is located. Field artillery assigns missions to some units which depend upon combat unit lateral boundaries to define the mission; e.g., the direct support mission.[23]

Other combat support branches are not considered part of the combined arms team. They do not provide the lethal fire support of the field artillery. Their interest in lateral boundaries is less doctrinaire.

Lateral boundaries do aid in establishing their responsibilities and relationships to supported units.

Gains Accrued from Using Lateral Boundaries

The establishment of boundaries is a rapid means of formulating and enforcing easily understood rules to control a crisis situation. They provide an identifiable means to impose limits of responsibility, insure unity of command, protect one force from lethal fires of another, ease the burden of control by fixing geographical limits for units, and they allow commanders freedom of action in a territory of their own.

Rules Formulated for Use of Lateral Boundaries

The rules studied are limited to those controlling the combined arms team, infantry, armor, and field artillery. Infantry and

armor units occupy and control terrain by fire and maneuver and by denying its use to the enemy. Field artillery units support the infantry and armor forces with indirect fires.

The Infantry School at Ft Benning, Georgia, and the Armor School at Fort Knox, Kentucky, develop doctrine (rules) for brigades and subordinate ground combat units.[24] The field artillery school at Fort Sill, Oklahoma, develops field artillery doctrine.[25] Existing doctrine from these schools is published in army field manuals. Rules for armor and infantry units defending at company and battalion level are the same with respect to lateral boundaries.[26] Units defend in their own sector as described by lateral boundaries. They coordinate their defense with units on their left and right. They are responsible for maintaining continuity of the superior unit's defense by retaining designated sites located at coordinating points on lateral boundaries. Retention of ground at coordinating points protects adjacent units from flank attack, a possibility if units defended their own sector without regard for the positioning of friendly units on their flank.[27]

Field artillery doctrine is more specific.[28] Because of the high lethality of the munition, concern for the location of each fired projectile, and the complexities of indirect fire, artillery units are greatly restricted by procedural doctrine.[29] Given a set of lateral boundaries for a supported unit, field artillery doctrine requires firing batteries to chart the supported unit boundaries.[30] Artillery battalions develop their own rules, often creating buffer zones along the lateral

boundaries into which they will not fire unless commanders on both sides of the boundary vouch that friendly units are not endangered by the request for fire.[31]

There appears to be a certain self-fulfilling prophecy of rules made for existing central measures. What is essential to understand is that given the availability of the lateral boundary as a graphic control measure, men are likely to develop an extensive set of rules in order to deal with the measure.[32] The rules developed may frustrate the mission at hand. This writer's personal combat experience as battery commander, maneuver battalion fire support officer, brigade fire support officer and as direct support artillery battalion executive officer lends total support to this observation. As a student of behavioral science, this writer recognizes the difficulty of changing established rules.

Relationship of Weapons Systems to the Battlefield

Modern weapons technology begs that all previously accepted control measures be re-examined for relevance, prudence, and safety. TRADOC Bulletin 2, entitled Weapons, Tactics, Training, dated April 1975, states that one Soviet antitank guided missile at a range of three kilometers has a sixty percent probability of a first round kill against an exposed tank. Assuming a US Army brigade defends with three battalions forward on a ten kilometer front, each battalion would defend approximately three kilometers, or one third of the brigade front. At maximum range, a Soviet antitank guided missile could shoot from flank to flank across

this battalion sector, killing an exposed tank less than thirty seconds after firing. The best defense against such missiles is the placement of aimed fire on the gunner who controls the missile's flight. This tactic is rendered invalid if one adheres to existing doctrine stating that fire will not be directed across lateral boundaries without prior coordination.

The Soviet tank has approximately a fifty percent first round hit probability at one and one-half kilometers. Its fast lethal projectile can kill a tank at this range in less than two seconds.[33] Should the weapons system fire across lateral boundaries there is no time to coordinate return fire and almost no time to evade the firing. The tactic required to survive against a tank is to shoot first from a hull defilade position.

One must question the relevance of existing control measures, given the increased accuracy, range and lethality of weapons systems on the high technology battlefield. A summation relating high technology weapons systems to the battlefield is: if you can be seen, you can be hit; and if you can be hit, you can be killed.[34]

CHAPTER III

SUITABILITY OF LATERAL BOUNDARIES IN ANTIARMOR DEFENSE

This chapter examines the suitability of lateral boundaries as control measures for battalion and lesser maneuver units during antiarmor defense.

The Commander's Changing Perspective

One may gain an appreciation for the changing perspective of the maneuver unit commander in the US Army's European force by recalling how US forces fought through central Europe in the 1940s and comparing that campaign with conditions expected if Soviet armies launch an attack in the 1970s.

US ground forces have shifted roles from the strong attacking armies of World War II to the outnumbered defending divisions of the present. The outgunned and outmanned US Army units in West Germany plan an antiarmor defense to accommodate the substantial increases in weapons lethality, engagement range, tactical mobility and communications which have evolved since World War II.[35] The question to be answered is whether graphic control measures, specifically lateral boundaries, should evolve to another form to function as valid command and control measures for the antiarmor defense.

The need for boundaries can be considered by looking for other control measures which serve similar purposes. Lateral boundaries

which constrain maneuver and fires may be no more effective than radio communication for providing a commander suitable control of his units's maneuver and fires. If radio communication is sufficiently able to control a fighting unit, then graphic measures and tactical radio are serving a common purpose. The measure of the value to be placed in lateral boundaries becomes, in this case, a measure of the redundancy desired for control of crisis situations.

Were one to consider the individual soldier as the smallest fighting unit on the battlefield, one might ask why lateral boundaries are not described about him. The answer appears to be that he is able to respond satisfactorily to visual and voice commands while he independently engages targets and coordinates with fellow soldiers on his flanks. Similar analogies can be drawn for sections, fire teams, squads and platoons. Individuals, and probably squads as well, define their boundaries in eco-psychological terms.[36] For instance, a squad leader might say, "Put your position over by that bush. Take anything that moves between the big pine on your left and the ridge line of your right." US Army doctrine since World War II has included lateral boundaries between defending company and higher echelon ground maneuver units.[37] One might question why units smaller than company do not require these graphic control measures, and what rationale supports the use of lateral boundaries at company or battalion level.

Current tactical systems have so increased weapons range, accuracy, speed and mobility and have so increased internal radio

communications beyond World War II capability that lateral boundaries at company and at battalion may be too restrictive and too redundant to aid ground forces facing a Soviet attack in Europe.

Lateral Boundaries and Current Usage

The commander and his senior staff officer, the S3, use lateral boundaries to aid in visualizing a battle plan, to allocate forces, to designate responsibilities, and to communicate plans to others who must understand and act upon his plans. Through training and habit, commanders and staff officers react swiftly to a visual presentation showing unit lateral boundaries.

Within the framework provided by the commander's concept of operation the brigade S3 proposes and assesses alternative courses of action in preparing a brigade plan of operation. Lateral boundaries serve the S3 as a simple, commonly understood tool enabling visual communication of location and responsibilities to the brigade's subordinate ground combat units. Employing only a simple transparency containing a few words symbols and straight lines, the S3 can readily convey a brigade defensive concept.

Upon receipt of the operation plan from the brigade staff, subordinate operations officers adjust their plans to respond to tasking perceived in the brigade plan. The maneuver battalion S3 plans and assesses courses of action which support the brigade plan. In the defense he habitually uses lateral boundaries to indicate the location, subordination and responsibilities of companies.

The direct support field artillery battalion S3 plans artillery support for the defensive operation with particular attention to lateral boundaries provided by the brigade. He initiates measures to

control fires by placing lateral boundaries on maps and charts in order that indirect fires not be placed outside the area delineated for indirect fires from the firing batteries.

Lateral boundaries at company level provide left and right limits within which the commander fights his force to defend the sector assigned. The lateral boundaries insure that no other friendly force will fire or maneuver into his sector without his approval. Conversely, the boundaries make the company commander responsible to insure that his force does not engage targets across the boundary without approval from the company commander on his flank.

Changing the Boundary

Changes in the battle demand that a commander be able to reallocate forces to cope with a new situation. A commander may add or subtract units, or he may shift boundaries to alter the force density of units within his sector of responsibility.

Should battlefield intelligence alert a commander that an attack against subordinate units is proceeding toward an area where two maneuver units share responsibility because of an existing lateral boundary, the commander may elect to shift the boundary in order to achieve unity of command thereby giving one subordinate full responsibility for a threatened sector in order to more easily coordinate the defense. Should the responsibility in such a defense remain split because of a lateral boundary, some effectiveness will be lost when coordinating the fires and maneuver of units separated by the boundary.

By adjusting lateral boundaries, a commander may adjust his defense to alter a force ratio, to achieve unity of command, or both. The new boundary can be designated by a series of map coordinates, by a grid line, by an identifiable terrain feature, an overlay, or by any other understandable technique.

When a boundary between two units is shifted left or right the defensive sectors of both units are disturbed. Commanders of the new sectors must adjust their plans, their troops and their fires in response to the change. Any adjustment consumes an increment of time which is crucial to a defense designed to halt onrushing armored forces. The rate of change of battlefield conditions may prove that time needed to accommodate boundary shifts is a prohibitively expensive tactical adjustment.

This time consumption could be critical for maneuver companies which confront the attacker and potentially face most numerous shifts in boundaries. To bring the element of time into critical perspective the writer postulates the following hypothetical situation facing the commander of a tank heavy company team. By structuring the team with two tank platoons and one mech platoon, the tank killing weapons might include twelve M60 tanks, three Dragons, five TOW and 15 LAW. This weapons mix gives the defender 20 tank killing weapons with at least a 50% hit probability at 1000 meters and 15 weapons with a 50% hit probability at 200 meters. At a three to one ratio the attacker could have 60 tanks plus infantry. Assuming the attack proceeds at twenty kilometers per hour across

an observed distance of one kilometer, the company will have three minutes to kill the 60 attacking tanks before they reach his position. In this situation the company team has to kill twenty tanks a minute whether the attack aims at the heart of his sector or aims toward a lateral boundary. Given these stark conditions a change in company lateral boundaries would be absolutely difficult to accommodate once the attack begins.

Unit Maneuver in the Antiarmor Defense

Maneuver is a crucial component in the concept of the antiarmor defense. It is the component enabling the massing of battalions which reinforce the defense against a breakthrough penetration and it is the component enabling the fighting companies and platoons to employ their weapons forward yet still give depth to the defense.

Fighting units displace from positions where they are unable to see, hit and kill the attacker to alternate positions where they can engage the attacker. A second reason for unit displacement occurs when the attacker achieves direct observation into a battle position and can bring direct fires to bear on it.

Movement increases the probability of detection, both visual and electronic. Our habit of relying on FM radios to organize and control movement increases the potential for detection by electronic measures. The larger the unit to displace, the larger is the control problem, the more radios are emitting, and the greater is the potential for detection.

This writer postulates that there is a relationship between the number of interunit radio transmissions and the adjustment of lateral boundaries to accommodate unit maneuver. The probability of electronic detection should decrease if an alternative position designating system requiring less coordination would be used. The use of nontangent positions is the primary alternative to conventional unit defensive sectors. These positions may be described either as unit areas of operation or as unit battle positions. Less interunit communication should be required to maneuver between nontangent positions than to disengage a unit from a bounded sector and re-establish lateral coordination in another.

Fires in the Antiarmor Defense

A previous example framed a situation where a defending company team used direct fire weapons alone against an attacking armor force resulting in the need to kill twenty tanks per minute. Differently stated, the defender needed to kill one tank per long range antitank weapon per minute. That scenario leaves only the very smallest margin for error. It also introduces an evident need for the third member of the combined arms team, the field artillery, to use its indirect fires to slow the attack.

By altering the scenario a somewhat different and perhaps more critical aspect becomes evident to the defending company team. Assume the attack succeeds against an adjacent unit and then turns

into the flank of the defending company team. With lateral boundaries everything to the left belongs to one commander while everything to the right belongs to another. There is neither a provision for a free fire area between commands to facilitate direct fires into the vulnerable flank or rear of attacking armor nor is there an opportunity to meet a flank attack without posing a significant threat to the safety of troops in the adjacent unit.

Considering an example where a laterally bounded company sector approximates 1000 meters, if an attacking tank were identified it could be targeted by TOW sections located 6000 meters apart.[38] This example demonstrates that laterally bounded sectors can hinder the maximum application of effective fire on an attacker. These theoretical scenarios should be tempered by another consideration; that average intervisibility in the United States sector of West Germany approximates 1200 meters.[39] Conditions of reduced visibility seem to argue for territorial control to insure that units cannot pass through the defense undetected. In dense fog, rain, smoke, snow or dust the command cannot afford to open a gap to penetration on the false hope that adjacent units have the area covered by fire.

Under conditions of good visibility, the use of lateral boundaries appears to waste valuable time in efforts to coordinate fires between adjacent commands whereas under poor visibility, rules for the use of bounded sectors help to insure that the attacker will be taken under fire.

Lateral boundaries hinder the application of indirect fires because of the coordination needed between adjacent units to insure troop safety. There is little question that area weapons are made more effective by increasing their freedom to engage targets, and that lateral boundaries decrease this freedom. Free fire areas surrounding defensive positions would logically increase the effectiveness of artillery and mortar fire by eliminating an overriding concern for the safety of troops in immediately adjacent units. Indirect fires cause tanks to "button-up" thereby limiting their ability to see and increasing their vulnerability to attack from the flanks and rear. Concomitantly, a decrease in a tanker's visibility reduces the attacker's capability to locate and suppress the defender's weapons systems.

Because the antiarmor defense is characterized by forward positioning of forces, by small reserves and by small unit maneuver, it differs from previous US Army defenses on the mechanized battlefield. Unit commanders confront another different factor; odds of at least three to one in the enemy's favor.

Faced with the great size and intensity of a Soviet breakthrough attack, the defending unit survives by outthinking and outfighting the enemy across a battlefield saturated with attacking targets. A commander defending in such circumstances should not be additionally encumbered by extraneous control problems. Whereas lateral boundaries should assist to array forces prior to battle, and may enhance the control of lightly defended terrain; these same boundaries may prove extraneous and burdensome to units fighting to halt a breakthrough penetration.

CHAPTER IV

WARGAME

This chapter presents a detailed wargame description and evaluation to test the value of unit lateral boundaries. The game was conducted by highly qualified professional military wargamers on a precise simulation of West German territory where a United States battalion task force might confront a major Soviet breakthrough attack.

Material in this chapter is important to the thesis because it offers a replicatable methodology for assessing the usefulness of unit lateral boundaries under conditions of simulated combat. The gaming process was necessary in order that professionally qualified but disinterested officers used their military judgment to evaluate the requirement for unit lateral boundaries at company and at battalion echelons.

Description of the Wargame

The game was driven by a time-phased scenario of Soviet unit activities. Prior to gaming, the author, currently a scenario writer for the Scenario Oriented Recurring Evaluation System (SCORES) Division of the Combined Arms Combat Developments Activity (CACDA), prepared a hypothetical scenario leading to

the engagement of forces in the battalion task force area. Each player was familiarized with general and special situations in the scenario. Players viewed the simulated battlefield on two adjacent glass panels prepared for rear view projection. The panels showed precisely the same situation with one exception; the left panel showed no company lateral boundaries.

Wargamers were officers from the Evaluation Branch, "Jiffy" wargame, SCORES Division, CACDA. Each officer was thoroughly familiar with TRADOC doctrine for defense against breakthrough penetration as discussed earlier in this thesis. Players were assigned roles representing critical members of the combined arms team as follows:

Major Maurice W. Healy--Battalion Task Force Commander

Major John T. Moser--S3, Field Artillery Battalion (155 SP)

Major Douglas M. Welch--Company Commander/Forward Observer, Companies A, B, C.

First Lieutenant Michael Barker--Fire Support Officer, maneuver battalion.

An unexpected assist came from Major Michael Goold, US Air Force Liaison Officer to the Combined Arms Center, whose contributions during the wargame proved quite valuable.

The Gaming Environment

Officers given roles with the task force (Bn Cdr, Co Cdr/FO, FSO) were situated in one room where they viewed terrain simulations and used military maps of the same area. The field artillery battalion S3 role was enforced by causing the S3 player

to work in a room separate from other players. He had access to a military map sheet of the area represented by the terrain board, but could not see the situation on the glass panels.

Player comments, decisions and orders were recorded throughout the game using a tape recorder. The field artillery battalion S3, although not allowed to view the situation, was monitoring situation reports and fire requests via the tape recorder amplifier. The amplifier simulated command and fire direction radio nets normally monitored by a field artillery battalion S3.

The Terrain Model

A forty-five square kilometer area in the classic invasion corridor known as the Fulda Gap was selected as the site for the battle to be waged during the wargame. A terrain model measuring eight by sixteen feet was constructed in four sections. Each section was of contoured styrofoam covered with paper maché and set upon four by eight feet sheets of plywood. Realistic topographical relief was achieved by measuring elevations from the contours of a gridded universal transverse mercator military map sheet, scale 1:50,000. Contour elevations were cut into thin layers of styrofoam mounted on the plywood base. With contour elevations in place, paper maché was applied to the contoured layers to achieve a precise scale replication of the actual terrain. The model was painted. Hydrographic features, manmade features and vegetation were then applied to the four terrain boards. The terrain model was prepared by the Training Aids

Support Office of the Combined Arms Center, Fort Leavenworth.

Developing the Tactical Disposition of Forces

The tactical disposition of forces was prepared to support a briefing presented to the Commanding General TRADOC as part of the Antiarmor Systems Program Review conducted at the Combined Arms Center. The author as a participant in the process recognized the highly professional depiction of forces and its significance to the wargaming portion of this thesis.

Positions for platoons of a battalion task force were tactically arrayed on the terrain model by the author with guidance and approval from the following officers assigned to key positions at the Combined Arms Center, Fort Leavenworth, Kansas:

Colonel James N. Beil--Chief of the SCORES Division, CACDA

Colonel Robert J. Washer--Chief of Committee 2, Department of Tactics, Command and General Staff College

Colonel Robert D. Wiegand--Special Project Officer, Antiarmor Systems Program Review

LTC James R. Pullin--Chief of Scenario Branch, SCORES Division, CACDA

LTC J. Byron Hancock--Threats Branch, CACDA

Major Raymond H. Dobbins--Scenario Branch, SCORES Division, CACDA

The site selected for each of the major antiarmor weapon systems was illustrated by arrows affixed to the terrain model.

White arrows were for tanks, blue arrows for organic TOW sections, and yellow arrows for TOW sections attached to reinforce the battalion task force. Primary directions of fire for antiarmor weapon systems were established and shown by yellow yarn stretched from the weapon site to a proposed target area. Intervisibility was checked to assure that no masking was present along the primary direction of fire.

With the aid of LTC Hancock, an expert on Soviet forces, a graphic representation of attacking Soviet forces was added by placing red arrows on the most probable avenues of approach into the battalion area. Scale model tanks and BMPs were set on the terrain board near the red arrows to depict likely targets.

Lateral boundaries for companies and for the battalion task force illustrated graphic control measures.

Preparation of Transparencies for Use in Wargaming

Having completed a representative tactical array, two color photographs were taken of the battlefield simulation; one showing battalion lateral boundaries, and one showing company and battalion lateral boundaries. Photographs were reproduced in eight by ten-inch color transparencies for use by players when viewing the different boundary configurations as projected against adjacent vertical glass plates measuring seven feet square.

Aware that successive iterations in gaming can produce a detectable degree of learning in wargame players, this author decided that simultaneous play of both boundary conditions would

be of great advantage.

A simultaneous game would serve to avoid data contamination caused by iterative play. It would also promote helpful discussion among players as they were caused to evaluate the tactical value of lateral boundaries.

Data Retrieval and Review

Data were retrieved from the tape recorded proceedings during gaming, and from interviews of players after the game. Data were reviewed in three categories: general comments; advantages to lateral boundaries; and disadvantages to lateral boundaries.

Findings

Careful review of data from the transcripts and interviews led to the following major findings:

1. Disposition of forces on the battlefield can be controlled effectively by moving units between predesignated battle positions.

2. Without lateral boundaries the field artillery finds the requirement to assure safety clearances prior to firing close support missions is an overwhelming responsibility.

3. Without company lateral boundaries there will be a significant increase in radio traffic at the battalion command post because of the need for unusually detailed status reports.

4. Without company lateral boundaries a battalion commander incurs a substantial increase in the volume of detailed

status reports he must maintain for subordinate units. This is especially significant if he attempts to monitor the battle positions of platoons.

5. Without company lateral boundaries a battalion commander exercises greater control of the battle. He can manage the battle with assurance that his battle plan will be followed.

6. The concept of a Soviet breakthrough attack is an extremely difficult one to visualize and with which to cope.

7. Officers accustomed by years of experience to deal with fire and maneuver of company and battalion units in terms of lateral boundaries feel comfortable with their knowledge, and do not wish to change familiar operating procedures.

8. The US Air Force fighter pilot is unconcerned with company and battalion lateral boundaries when flying close support missions.

9. Lateral boundaries stand as a fulcrum balancing troop safety and weapon systems effectiveness. With lateral boundaries a commander is certain that effective fires can be massed on an enemy. When the danger of having a portion of the command annihilated by an attacking force exceeds the danger of exposing troops of the command to friendly fires, lateral boundaries and the rules associated therewith become invalid as control measures.

CHAPTER V

CONCLUSIONS

This chapter will attempt to assemble all the information obtained through research, interviews, wargaming and personal reflection to answer the question: with a forward defense in Europe, do internal lateral boundaries aid the fighting brigade?

Summary of Findings

Chapter I introduced recently developed TRADOC doctrine for forward deployed combat units defending against a greatly superior force attacking to achieve a breakthrough penetration. This doctrine dictates that the defender mass his combat power in a narrow sector to reinforce the defense and block the breakthrough. The entire defense is keyed to a singular mission, stopping a major penetration. All other considerations, therefore, are subordinated to accomplishment of that singular mission.

Chapter II presented a detailed examination of unit lateral boundaries, what they mean to members of the combined arms team, and what rules have evolved to accommodate these graphic control measures. This chapter noted that rules evolved to accommodate boundaries have become locked in procedural doctrine. Major rules for the safe delivery of indirect fires were found to be framed by concepts developed from the use of lateral boundaries as graphic control measures. Chapter II also indicated that ground weapon

systems have increased in range, accuracy, and lethality to an extent such that opposing weapon systems can acquire and kill each other in seconds over ranges well in excess of laterally bounded company sectors.

Chapter III discussed the suitability of lateral boundaries in antiarmor defense by considering fire and maneuver at battalion and lesser echelons. This chapter noted that local commanders will be taxed to outthink and outfight a superior enemy force. Time for reaction is minimal and of great criticality to the defense.

Chapter IV was a detailed explanation of a wargame conducted to test key members of the combined arms team and to compare their actions and orders as they employed the new TRADOC antiarmor doctrine in two situations differing by only the absence of company lateral boundaries and associated rules in one situation. Analysis of the game showed that carefully selected combat experienced officers who were professional wargamers encountered two major difficulties:

1. They became greatly concerned about a commander's freedom to operate territorially in a "sector of responsibility" at the expense of the overall mission - stopping the breakthrough penetration.

2. They had no suitable rules for control of indirect fires when operating without lateral boundaries. Mindful of the "old" rules they became confused and hesitant to shoot artillery in this case; thereby, failing to take advantage of essential combat power.

Conclusions

From the foregoing summary of findings this author concludes

that the United States Army must prepare to fight without lateral boundaries at company level. It is evident that unit fire and maneuver are not maximized against a breakthrough attack because of constraints established by rules associated with a graphic control measure, the unit lateral boundary.

It is concluded that rules associated with lateral boundaries are the source of lost combat effectiveness. The graphic control measure is no more than a line until tacticians give it meaning. Therefore, an army preparing to defend against breakthroughs must reassess the commander's responsibility in the trade-off between troop safety and weapon systems effectiveness. When the trade-off is between the quick and the dead, being safe seems to equate with the latter. Concommitantly, until commanders are assured that troop safety from friendly fire is a consideration secondary to killing the attacker, the army remains in danger of failing its main mission.

It will be very difficult to change the thinking of veteran US Army officers so that they can operate effectively without lateral boundaries. Rules established relating to the use of these control measures have been so deeply rooted in the thought processes of tacticians that removal of lateral boundaries will force an unsettling change in established patterns of behavior.

The ability of US Army combat units to fight without lateral boundaries is important to the outcome of future wars. This ability is crucial when conducting a forward defense against superior forces comparable to the Soviets. Analysis and wargaming indicate that lateral boundaries at company and battalion echelons do aid the

defending brigade, but perhaps not enough, nor as required to gain the practicable maximum combat power from high technology weapon systems in the field today. Further, it is found that tacticians have rules derived from the existence of a graphic control measure, the lateral boundary, which stand as doctrine, but do not adequately support current defensive concepts. By removing lateral boundaries in a wargame, a confusing void was created in defensive doctrine because long standing rules directly affecting the application of combat power were rendered invalid.

The US Army can scarcely afford to risk allowing its doctrine to detract from its ability to exercise the full combat potential of high technology weapon systems. The risk of progressing with a confusing void in doctrine is an unacceptable alternative. The US Army stands in need of new rules which will enable tacticians to most effectively use the weaponry now available.

New rules should stress effectiveness in weapon systems employment with troop safety an important but secondary consideration. After formulating a new generation of rules for success on the high technology battlefield, a program of vigorous training is needed to teach units how to fight.

Areas Requiring Further Study

There is a compelling need to enable the optimum application of indirect fire systems on the unbounded battlefield. A simple efficient system for clearing fires is needed. It is suggested that a terrain board simulation and methodology comparable to the one used in this thesis would aid in finding and testing a system.

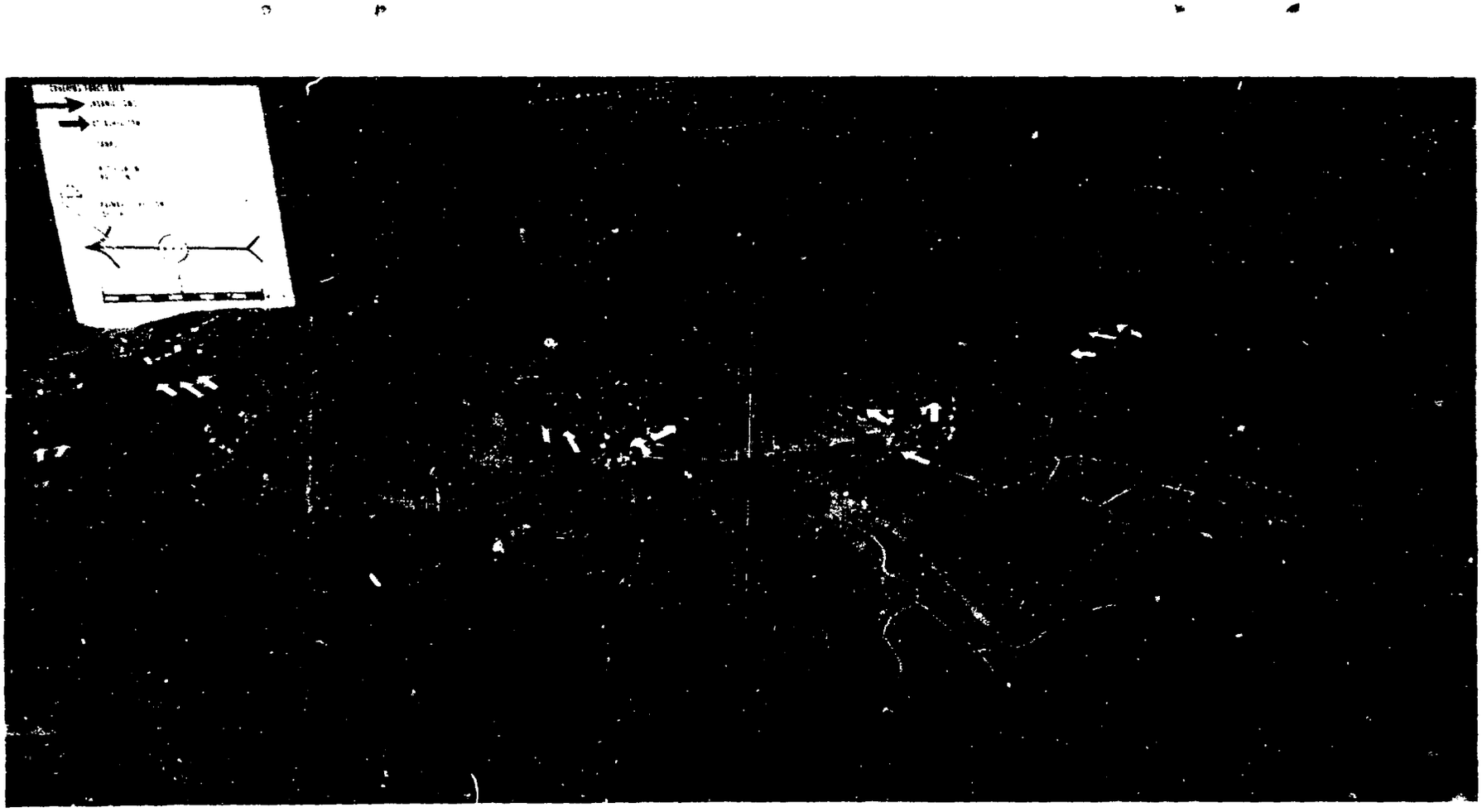


Figure 1. Wargame Battlefield with Company Lateral Boundaries.

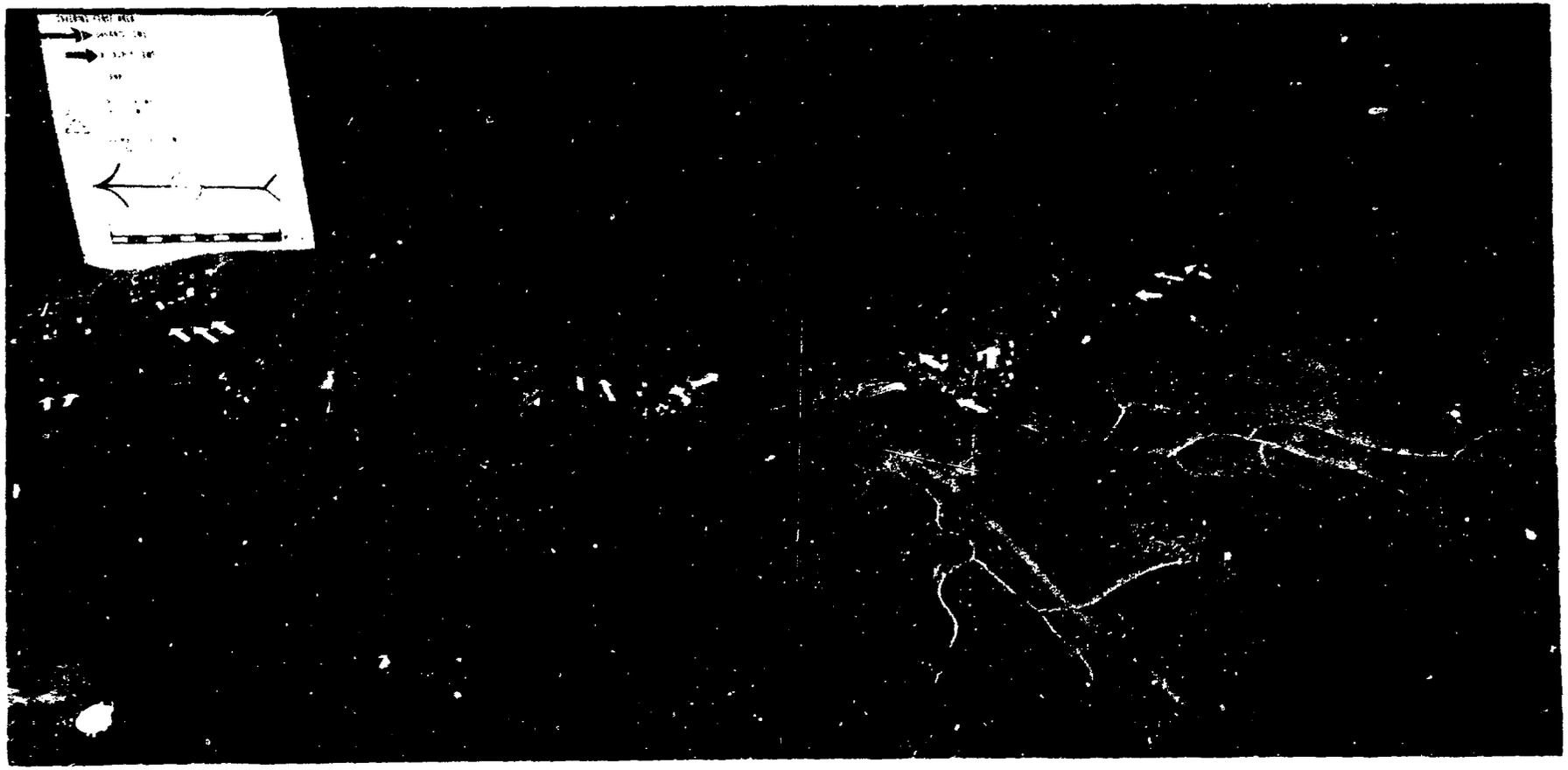


Figure 2. Wargame Battlefield without Company Lateral Boundaries

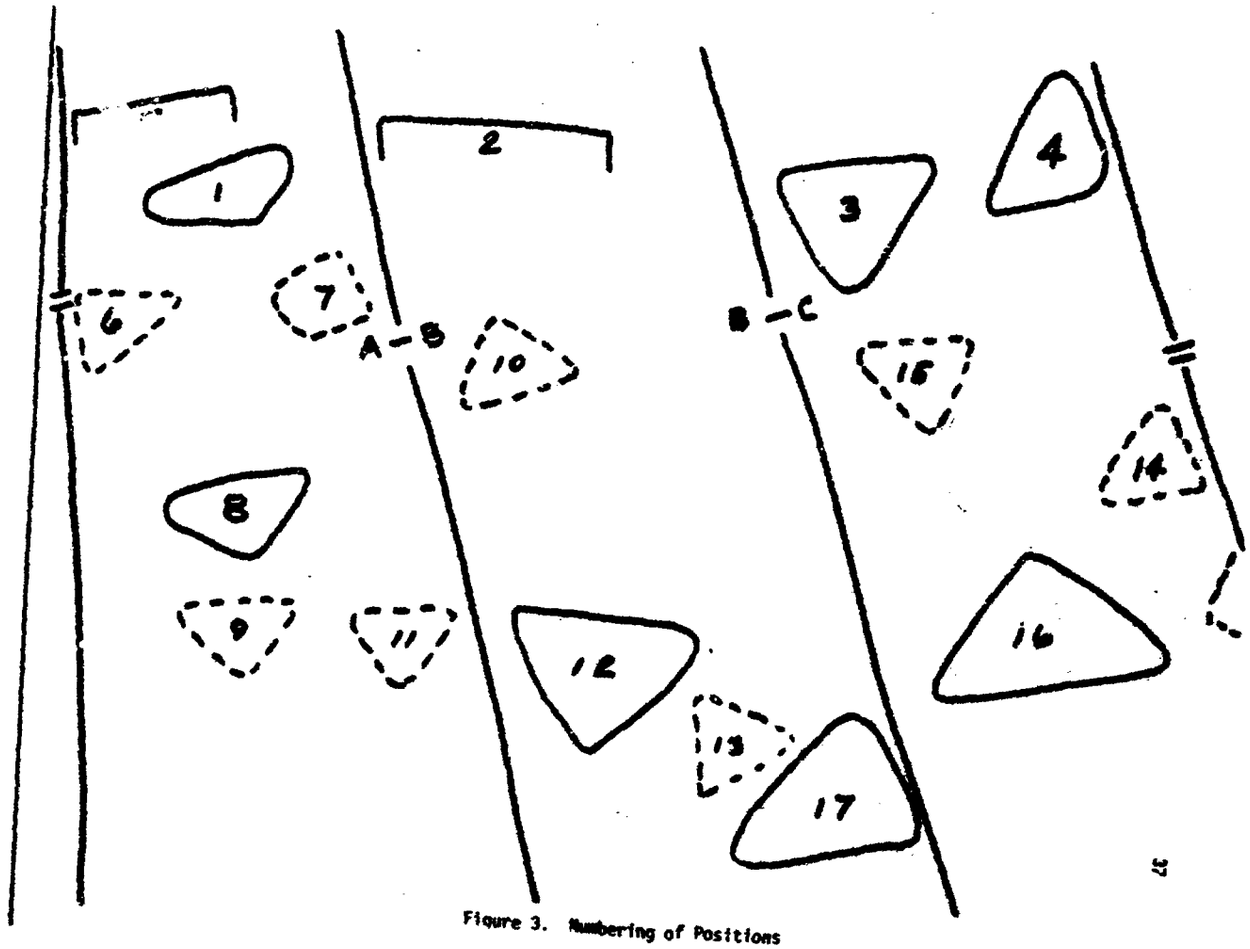


Figure 3. Numbering of Positions

APPENDICES

APPENDIX A

PREGAME SCENARIO

PREGAME SCENARIO

Shortly after dawn on 20 September, Soviet forces supported by Warsaw Pact allied launch a full attack into West Germany to decimate forward deployed NATO forces and to lay claim to the nation state of West Germany before political machinery in the United States can reach a decision on the release of nuclear weaponry. NATO intelligence had detected apparent Soviet mobilization early in September, but national command authority withheld this information from all but the highest level field commanders so as not to escalate the rise in international tension.

After unsuccessful councils, US combat units were ordered to their general alert positions on 14 September. Your division disseminated its basic load of ammunition to fighting crews by the evening of 15 September, and was authorized by the West German government to begin erecting defensive positions. On 16 September as construction of obstacle zones was started in your brigade sector, the civil population seeing the preparation and having learned of the on-going mass evacuation of US dependents and civilian employees, left their homes by automobile to seek refuge. The resultant refugee traffic halted US military road movement until 18 September. On the afternoon of the 18th, materials essential to preparation of positions and obstacles began to arrive. Your battalion continued preparation of positions in the division main battle area.

By D-day, your companies have prepared and occupied initial battle positions, have completed half the work on alternate positions, and have located their third battle positions and rehearsed movement over protected routes to reach them.

By mid afternoon of D-day, the Soviet attack appears to bear out prebattle assessments that a breakthrough penetration will be attempted in your sector. By evening on D-day, intelligence confirms that a Soviet tank division is concentrating for a breakthrough at the sector defended by your brigade. Units from the covering force fight back to your battalion sector during the evening of D-day reporting heavy fighting with increasing numbers of Soviet tanks. By 0200 on D+1, about thirty percent of the covering force battalion to your immediate front has fought their way back to reinforce your battalion's defenses. From 0230 until dawn, your battalion positions take a terrifying pounding from Soviet cannon and rocket artillery.

As twilight approaches, you peer across the broken and shattered man-made hell, through the smoke from burning forests, homes and vehicles, and into the low-hanging morning fog to search out armored vehicles making that unmistakable sound that seems only seconds away.

To your battalion front, lead units of a reinforced Soviet tank regiment are headed almost directly into your positions. Weather conditions are dominated by morning ground fog which limits visibility to ranges from 200 to 700 meters. Sunshine is expected to burn away the fog layer by 1030.

Terrain and the initial disposition of forces are shown on the glass panels to your front. This same area is outlined on your maps. You may use the grease pencils to make any adjustments you desire to the intital situation, to include changing boundaries, positions and forces.

You will use tactics from FM 100-5 to conduct your defense. One reinforced mechanized company task force has been alerted for possible use in your battalion area.

The pace of the game will be controlled by events read from a prepared scenario of Soviet actions.

APPENDIX B

SCENARIO OF SOVIET ACTIONS

SCENARIO OF SOVIET ACTIONS

0730: Lead Soviet tank units approach battalion forward battle positions. Engagements begin. Range is 450 meters.

0735: Soviet tank units engaging forward battle positions near center of battalion front.

0745: Soviet tank units continue to mass in the area of engagement. Soviet units encounter forward battle positions on the battalion right and are approaching on those on the left.

0800: Soviets increase pressure at the battalion center. Artillery barrages are intensified. Visibility in fog and smoke ranges from 200 to 600 meters.

0805: Limited numbers of Soviet tanks and BMPs engage forward battle positions on the battalion left.

0815: Contact established all along the battalion forward battle positions. Soviets continue to mass units in the center.

0830: Soviet forces advance in the center at rate of 400 meters per hour, on the right at 150 meters per hour, and on the left one tank company is moving undetected into battalion defensive area.

0900: Soviet rate of advance in the center increases to 500 meters per hour. Rate of advance on the right increases to 200 meters per hour. Contact on the left is light except for the Soviet tank company which passed through the area and has just overrun a DS artillery battery to the left rear.

0930: Visibility improves to 500-1500 meters except for smoke. The Soviets commit regimental second echelon units on the battalion right.

1000: Visibility improves to 1000-2000 meters except for smoke. The attack continues. Rates of advance remain at 500 meters per hour in the center but increase to 300 meters per hour on the right. Soviets advance their second echelon regiments.

1030: The fog is lifted. Except for smoke, ground visibility is unrestricted. Ceilings are 3000 feet with scattered clouds. Soviet regimental first echelon units are 45% effective. Regimental second echelon units are 60% effective. The second echelon regiment is committed.

APPENDIX C

TRANSCRIPT OF WARGAME

TRANSCRIPT OF THE WARGAME

Players

Eagle 6 -- Commander, Battalion Task Force

Alfa 6 -- Commander, Company A
Forward Observer Company A

Bravo 6 -- Commander, Company B
Forward Observer, Company B

Charlie 6 -- Commander, Company C
Forward Observer Company C

Redleg 3 -- S3, Direct Support Field Artillery Battalion

Redleg 8 -- Fire Support Officer

Start of the Game

Author: At 0730, lead Soviet tank units approach forward positions. Engagements begin. Range is 450 meters.

Bravo FO: Fire mission. Grid (coordinates) tanks in column 450 meters to my front, Azimuth ( ), will adjust, over.

Redleg 3: Shot, over.

Bravo 6, this is Eagle 6.

Bravo 6, over.

This is Eagle 6: What have you got going, over?

Bravo 6: Have one reinforced tank platoon moving into my area, over.

Charlie 6 - Eagle 6: What have you got going, over?

Charlie 6: Observe enemy tanks to my left front. Seem to be approaching Bravo 6's area, over.

Charlie 6 - Eagle 6: Can you engage with ground Weapons, over.

Charlie 6: Roger, can engage with light AT weapons from observation posts to my front.

Discussion

Major Healy: Do we want to go ahead and shoot him across boundaries or do we want to keep him quiet until something comes into his area? Think I should tell Bravo Company that Charlie Company has AT weapons in position that can hit tanks approaching Bravo Company.

Over here (without boundaries) I orchestrate it. I would go ahead and tell Charlie Company to go ahead and engage those targets. The difference is that without boundaries the battalion tells Charlie Company to go ahead and engage targets. With boundaries, the battalion offers Bravo Company the assistance of units from Charlie Company.

1LT Barker: Would the artillery battalion S3 have done anything different on the fire mission if company boundaries had not been there.

Major Moser: Yes, the fire support officer would have to coordinate. The fire support officer has got to keep up with where forces on the ground are. He has to do it because there isn't anybody else to do it. The fire support officer has to call the forward observer to see if there are any friendly forces in the impact area.

Major Welch: How much does that slow down the mission?

Major Moser: Depends on the available information. Those three FOs are all on the same fire control net. They should hear each

others calls for fire. Any of the FOs monitoring fire which endangers their troops will call back to the FDC.

Major Healy: If that fire does not endanger their troops, they consent by silence. That would be the infantry way to do it. The most expeditious way.

Major Moser: On every call for fire that is made, (without battalion boundaries) silence means acquiescence to the mission. It places an additional burden in the FOs of the adjacent companies to be damn sure they monitor that fire net at all times, and keep up with where their people are on the ground all the time. That means twenty-four hours a day.

Author: At 0735, Soviet tank units are engaging forward battle positions near the center of the battalion front.

Bravo 6 - Eagle 6: You have a reinforced platoon attached to you. He will arrive in 30 minutes. Meet him at such and such location.

Discussion

Major Healy: Over here in the case without boundaries, I would tell that reinforced platoon to move into blocking position 10.

Major Welch: We are going to need more artillery.

Major Healy: At this point we say the covering force, or what is left of it, has already completed the passage of lines. I've got what's left of my antitank platoon back and a reinforced company from the covering force back, and I've gone ahead and employed the reinforcing company into blocking position 10. The other reinforced platoon went to Charlie Company and he put them into blocking position 14.

Author: At 0745, Soviet tank units continue to mass in the area of engagement. Soviet units encounter forward battle positions on the battalion right, and are approaching those on the left.

Major Welch: I see nothing different except we need more artillery.

1LT Barker: DS artillery is going to be answering calls from two FOs. The battalion commander has established priority of fires to Bravo Company. The FSO has got to let the battalion FDC know that. The FDC takes that into account when they program fires in support of calls for fire from those two different FOs.

Without boundaries, it probably would not make any difference. It depends on which FO is calling for fire.

Major Welch: Right now we call for our final protective fires. Your barrage fires should be planned and appropriately shot in prior to the engagement.

Major Moser: The only place you might have a conflict ... here again the battalion commander has got to make that decision, is if you have more barrages for a particular mission. If all your barrages exceed the resources of the battalion that is firing for you, the battalion commander must decide which barrage he wants shot. Company boundaries would not make a difference.

Major Welch: Because of fog, we have limited the effective range of the TOW. I want to save those TOWs. I am going to pull them back. I know that TOW is not effective less than 800 meters. Bravo Company is moving TOWs back to blocking position 10.

Major Healy: I have already reinforced with that reinforced company that came up from somewhere else. I've given Bravo and Charlie Company a reinforced platoon and kept one platoon as my reserve.

The difference between the two cases is that I specified the positions, 10 and 14, for platoons when operating without company boundaries.

Author: At 0800, Soviets increase pressure at the battalion center. Artillery barrages are intensified. Visibility in fog and smoke ranges from 200 to 600 meters.

Discussion

Major Healy: We are still holding our position. We are trying to visualize the ground location of the enemy force.

Eagle 6, this is Bravo 6: Enemy pressure increased. Visibility 200-600 meters. Estimate enemy is echeloned in depth and my position will become untenable in about 15 minutes over.

Eagle 6: Roger, out.

Charlie 6 - Eagle 6: What's happening in front of you, over.

This is Charlie 6: We have increased movement to our immediate front. Am observing to my left front an estimated reinforced company in Bravo Company's area, over.

Eagle 6: Roger, out.

Alfa 6 - Eagle 6: What's happening, over.

This is Alfa 6: No contact, over.

Eagle 6: Roger, out.

Eagle 6, this is Bravo 6: Final protective fires complete. Request permission to withdraw from blocking position 2, over.

This is Eagle 6: Wait, out.

Charlie 6 - Eagle 6: Can you engage those targets to your northeast, over.

This is Charlie 6: Negative. I have increased movement to my front. Am using all organic weapons to engage at this time, over.

This is Eagle 6: Roger, out.

Bravo 6 this is Eagle 6: Go ahead and pull that platoon back. Break. I'm sending you another reinforced platoon from the covering force, over.

This is Bravo 6: Roger. Request reinforced platoon meet me, and I CAC ( ).

Alfa 6 this is Eagle 6: On order, be prepared to move your elements in blocking position 5 to ___.

Discussion

Major Healy: This is how I'd do it if we had company boundaries...

Alfa 6 this is Eagle 6: Be prepared to move out of positions 1 and 5, and fall back to along a line 6 to 7. Be prepared to assist Bravo Company in his move out of 2.

If we didn't have company boundaries, I'd tell Alfa 6 to move back to 6 and 7 and engage any enemy targets in front of blocking position 2. In this situation, you just issue a frag order where he would be the covering force for those units withdrawing from blocking position 2.

The difference is that over here (without boundaries) he doesn't have to clear anything. I've already cleared it for him to fire out here in front of blocking position 2.

Here (with boundaries) Alfa Company's clearance has to have Bravo Company's acquiescence. Bravo Company has to approve any fires that go across that company boundary from blocking position 7. But over here (without boundaries) I've already told him to occupy position 7. Engage targets in front of position 2. This

means that Bravo Company will have some bullets zinging overhead, but that's alright.

Major Moser: This is about the time it gets to be a sticky wicket for the artillery.

Redleg 3 this is Bravo 6: Fire mission. From Grid ( ) to Grid ( ), Azimuth ( ). Tanks approaching village, will adjust, over.

This is Redleg 3: Shot, out.

Discussion

Major Welch: All the civilians are out of that built-up area according to the scenario.

1LT Barker: With company lateral boundaries the company commander has a lot more freedom of action. He can move without having to tell you what he's going to do. Without company lateral boundaries a great additional burden is placed on the battalion commander to know where all his subordinate units are.

Redleg 3 this is Alfa 6: Fire mission. Grid ( ) Azimuth ( ), tanks, will adjust, over.

Alfa 6 this is Redleg 3: Shot, out.

Discussion

Major Welch: A lot of people look at those company boundaries and say that is just for artillery, but it is not. The company commander knows where he can move.

1LT Barker: Gives him some freedom to say I'm going to do this because this is my terrain. Whereas, if you position his platoons, he can't do that.

Major Healy: That's what causes me a hang-up.

Bravo 6 to Eagle 6.

This is Bravo 6: I called in fire to destroy the built-up areas. I am in the process of withdrawing, so keep me informed, over.

This is Eagle 6: Roger. Break. Did you use that Engineer platoon I have attached to you to help destroy that vil?

This is Bravo 6: Roger. Demolitions and booby traps have been set at 7, all systems go. Break out. Alfa 6 - Eagle 6, over.

This is Eagle 6: Go ahead and move your forces out of 1 and 5 back of line generally running between 6 and 7, over.

Charlie 6, Eagle 6, over.

Charlie 6, over.

This is Eagle 6: What's the situation to your front, over.

This is Charlie 6: We have contact all over the front. The situation is not critical. We are engaging with the light antitank weapons. Estimate 1 reinforced company to the front, over.

This is Eagle 6: Roger. Be prepared to move . . .

Discussion

Major Healy: If we did not have company boundaries, I would move the platoon that's in blocking position 3 back to blocking position 15. I would leave blocking position 4 as it sits. When we do have company boundaries, I would probably give Charlie company a "be prepared" mission to move out of blocking position 3.

Author: Why the difference?

Major Healy: Because with a blocking position, that area is his responsibility to defend as he sees it. Yet, I want to contain this penetration if I can. But I don't want to leave him out there

to get cut off. O.K., so I'm going to pull him out and drop back. I don't know if I would or not. See, this company's boundary here, all that . . . . we can move it. Maybe that's the solution. If we can move this company boundary here and give Charlie company responsibility for that road. Whereas, over here he would automatically have responsibility for this road if he didn't bear very close to it. So, I don't know, maybe a boundary shift to make over here.

Author: Go ahead and implement that.

Major Healy: Let me discuss it with the expert here, Doug (Major Welch). We've got a platoon pulling out of 2 in Bravo Company. He's using artillery and the engineer platoon that's attached to destroy that village. That's causing a visual obstacle. I've got a choice here of moving this company boundary to give Charlie Company responsibility for this major action. O.K., so I can move that company boundary and that lets him just concentrate on this highway and I don't really have to move him yet. If I leave that company boundary there, then I'm pretty much obligated to release and work this guy. He's going to have to move.

Major Welch: You may have to move him yet. Right now, we're at the point where you've destroyed this village, pulled out of 2 and gone back to 13.

Major Healy: So I can do one of two things. If I leave the company boundary as it sits, I need to alert him to pull his platoon out of here. However, if I move the company boundary to here, and

between these two major roads, give him responsibility for this other one . . . .

Eagle 6 - Charlie 6, over.

Go ahead Charlie 6.

Charlie 6: Enemy increasing pressure all along the front. Blocking position 3 is becoming untenable. Request permission to withdraw from 3 and 4.

This is Eagle 6: Wait. Out. Break. Bravo 6 - Eagle 6: How are you doing with blocking position 2?

Bravo 6: We are enroute to our supplementary position. Will inform you when we close that area, over.

Eagle 6: Roger. Out. Break.

Charlie 6 - Eagle 6.

Charlie 6, over.

This is Eagle 6: Go ahead and move 3 to stay in 4.

Charlie 6: Wilco.

Eagle 6: I've already got Alfa back to 6 and 7.

Discussion

Major Healy: You've got two initial reinforced platoons, one in 13 and one in 10, right? Or did I give you that other one yet?

Major Welch: You only gave me one, and I'm just informing you that the new location will be with this reinforced platoon. So, I'm just giving CAC code that I'm dropping off here and going along with this platoon. My CP is here.

Major Healy: O.K., and that platoon that was here, we're going to have to move to 13.

Bravo 6, Eagle 6, over.

Bravo 6, over.

This is Eagle 6: Sending a new reinforced platoon to deploy as you see fit.

Bravo 6: Roger, meet me . . . . (coordinates).

Charlie 6, Eagle 6, over.

Charlie 6.

Eagle 6: I'm sending you an additional reinforced platoon to deploy as you see necessary.

Charlie 6: Roger, coordinates, CAC, such and such.

Alfa 6 - Eagle 6: Be prepared to move from blocking position 7 to form a line generally out in front of this little knoll here. Defend from blocking position 6 along the line extending generally to blocking position 10.

Alfa 6: Wilco.

Discussion

Major Healy: O.K., now over here without the company boundary, I would tell him to move from blocking position 7 to the vicinity of this knoll and these reinforced platoons that I gave him, I think I would give them to other designated places to set up. In Charlie's case, I put him in this blocking position that we don't have numbered. (on extreme right flank). In Bravo's case, I'd probably tell him to put it in blocking position 12.

Author: We're probably only a half-hour into the battle and the enemy's two or three hundred meters into your position. We've overrun the scenario. I will read the events you have anticipated.

Scenario Events Reviewed

At 0805, Soviet tanks BMP's engage forces along the right. We did that already. At 0815, contact is established all along the forward battle positions. Soviets continue to mass units in the center and on the right. We've found some guys in front of A Company, very light though, just a screen. The main attack continues to be in the center. At 0830, Soviet forces advance into the center at the rate of 400 meters an hour. On the right the rate of advance is 150 meters per hour. On the left one company is moving undetected into the battalion defensive area. Jump to the time period where your FEBA trace is. At 0900, the Soviet rate of advance increases in the center to 500 meters an hour. The rate of advance on the right is 200 meters an hour. Contact on the left is light except for the Soviet company which passed through the area and is overrunning a DS artillery battery to the left rear. Because of the fog and all that, a Soviet tank company was able to come through on the left and went back and ate up a DS artillery unit . . . like ships passing in the night. 0930: visibility improves to between 500 to 1500 meters except for smoke. Soviets commit their second echelon regiments on the right.

Discussion

Major Healy: Got a report from DS unit that they were being hit. They were using their 155 SP's in direct fire on a Soviet tank company. I'm dashing off my antitank platoon to screen the rear. What I'll do is give that antitank platoon responsibility to cover my battalion rear. I don't see a shift in company boundaries. Yeah, I do, too. Got an awful wide frontage with that company. I

think we'll move that Bravo/Charlie company boundary north so it runs between major highways.

Major Moser: We've got those boundaries. It's no problem. The LO can tell the battalion FDC about the boundary change. That's no problem. It's not so much of a problem as long as the units are fixed and in place. You start to hit the problem without boundaries if you've got units starting to get up out of their holes and moving. Especially where the flanks of two units tend to overlap.

Major Healy: We don't want to engage friendly forces.

Major Moser: An FO and company commander look off to their flank and see a cloud of dust and a bunch of tracks. They don't know . . . It's even worse. Everyone was running scared, because they're getting shot at by all the enemy artillery, plus the enemy track vehicles, and here's more track vehicles coming.

Major Welch: It's not so bad as long as everyone's in position. It's when they're leaving position and moving to alternate or supplementary positions.

Author: That's the name of the game.

Major Moser: And that is exactly when the problem of boundaries comes in. Especially if you've got a company that's got past you. Every FO knows that. Most company commanders do. And they're always taking a glance over the back shoulder in whatever they do. They see clouds of dust and so forth . . . they certainly wonder.

Major Healy: Wonder afterwards.

Major Welch: Yeah.

Major Healy: With company boundaries then, the company commander can move a unit and tell the battalion commander that he's moving the unit and leave it at that . . . after he's got permission to drop out. Without company boundaries he's going to have to give a closing time; he's going to have to give the route that he's on. I think he's have to transmit at least those three things, don't you, Doug? Whereas with company boundaries, he is saying I'm moving: I'm starting to move now; I'll notify you when we occupy the new position. He doesn't have to worry about anybody shooting up his flank. Whereas without the company boundaries, he has to give the route, start time, and anticipated closing time and verify the closing time.

Major Moser: Without boundaries, the FO's of the adjacent companies and the liaison officers of the battalions have got to be on their toes to keep up with the real time location of where everybody's at. It really puts the onus especially on that battalion LO.

Major Healy: Well, it does the same thing with this platoon. It can engage across that new company boundary that we drew.

Major Welch: For the indirect fire people, it's a problem and for the direct fire people. I don;t know how you're going to handle it through a platoon.

Author: You get down to that platoon and squad. We don't have squad boundaries; don't have platoon boundaries. If we don't have those, then why do we have company? Why don't you have an individual man boundary? It's what you call an ecopsychological thing. You're responsible

for targets coming by a tree; you gotta identify these things. There comes a point where you cannot identify these things in a man-tree-target equation. In that area, and that's kinda rough, lies a crossover point between the eco-psychological response and the requirement for control measures.

Major Healy: I don't really see that we're going to change anything.

Author: O.K., we'll go on. It's 0930. We just said that visibility has improved in the range from 500 to 1500 meters except for smoke. Soviets commit their regimental second echelon units on the right.

Bravo 6: O.K., we've called in artillery here, and here move out. You know, out of the fire up here, from this blocking position 3.

Author: At 1000, visibility improves in the ranges from 1,000 to 2,000 meters except for smoke. The attack continues. Rates of advance remain at 500 meters per hour in the center, but increase to 300 meters per hour on the right. The Soviets advance their second echelon regiment.

Charlie 6 - Eagle 6: What is 4 getting out there? Is he receiving any pressure? It may be time to pull 4 back into 14.

Charlie 6: We've been pretty well shot up, out here.

Eagle 6: If 4 and 15 are still holding fast, then there's no reason to move them if they're containing that penetration. That's all we're trying to do is contain that penetration.

Bravo 6: That's why I want to leave 4 out there and that's why I don't want to pull out 6. How much more pressure is on the front?

Author: I'm now the brigade commander, and I'm shooting you another reinforced company. This is Mech.

Discussion

Major Healy: With the company boundaries, if I got a reinforced company, I would break in on them and I would probably give a platoon here and keep a platoon in reserve. I've already used every reserve I've got. The antitank platoon still has a mission to screen in my rear cause that turkey back there is wandering around back there shooting up my artillery support. So I'd employ one platoon here and one here. That means that both company commanders, Bravo and Charlie company commanders, now have six platoon companies. That's a pretty big company for a captain to control. In this situation, without the company boundaries, the forces would go about in the same area; one in Charlie company's area and one in Bravo company's area. I'd have to control them all and that kinda bothers me. I don't think I can redraw on another company and fit him in here. I don't know, maybe I can put another company boundary down here say . . . .

Major Welch: One thing you're going to have to consider at this point is whether or not you want to allow that penetration to occur in the center. If you do, then we just pull this guy on back. That's where I think would slow me down.

Major Healy: We gotta pull this guy back. If I got that reinforced company, using company boundaries, I've got two options. I can either split him up; give you a platoon, or I can figure where to put another company boundary in.

Major Welch: I think I know what I would do. I'd go ahead and build up a force on this side and this side. I'd hit them as they're moving down through here.

Author: You've got to stop the breakthrough. That's the name of the game.

Major Welch: I'd hit them with a counterattack first and then hit them here. If the counterattack fails, you know you can eat them alive with a reinforced company. You'll do O.K., a wide open area out here—total them.

Major Healy: I don't think I'd run him in the counterattack; I'd run him in a blocking position.

Author: The Soviet second echelon regiment is coming in behind this force you are fighting. You've got four battalions against you. Their other forces are beginning to make noises as they come into your area.

Major Welch: I want more tanks.

Author: Unfortunately, we don't have any more tanks to give you.

Major Welch: You have a thousand meters plus; you would have room for another platoon. In fact, you could put three platoons here . . . if you didn't want to use that reinforced company to counterattack.

Major Healy: I've already pulled these troops out, maybe I shouldn't have. I probably should not have. Say, I did it with giving Bravo and Charlie company each a platoon, a reinforced platoon. I'd have one platoon as a battalion reserve. Over here (without boundaries) I'd do basically the same thing except, I'd probably specify where I wanted them. That's what gives me the hang-up over here. You've got three major blocking positions at Bravo

Company. You have to hold 14, so over here I'd tell them to go into this unnumbered blocking position.

Author: Let's go 10:30. The fog has lifted. Except for smoke, ground visibility is unrestricted. Soviet regimental first echelon forces are 45% effective; regimental second echelon units are 60% effective. The second echelon regiment is committed.

Eagle 6: Request all the air power I can get across those three companies.

(U.S. Air Force Liaison Officer, Major Michael Goold enters)

Discussion

Major Goold: Where's he going to break through? They're going to be coming cross country by that time. That acquisition is going to be easy, right? Mavericks, tremendous.

Author: The ceiling is 3,000 feet. We've had fog, it's burned off. It's September in Germany.

Major Goold: That's about the minimum ceiling that we could ever deliver Mavericks under. Good optical contrast country . . . oughta be able to put some Mavericks out in this area. If we had A-10s it'd be great up there . . . flying this way, shooting over people.

Author: September, 1976. We don't have them yet.

Major Goold: I can conceive that you might get four flights of four aircraft each. You can ask for more, but they probably don't have them.

Author: Well, this is just one battalion that's in the corps. This is one critical area.

Major Goold: So, we give to you four F-4s with about sixteen Mavericks or so . . . you might be able to get eight tanks out

of there. The main thing it's going to do, when you blow a few tanks, it's going to make them think everybody's coming. They're going to have to get the air defense out; they're probably going to slow down and they're not going to want to be looked at too much. And they're probably going to try and get undercover because they know we're using optical weapons. So just having the four airplanes work the area for 15 to 30 minutes is going to slow the enemy down . . . unless he's a devil-may-care enemy and presses on. At least they'll make him concern himself with those airplanes that he sees running around up there. They (F-4s) are going to attack from the friendly side using pop-up type maneuvers. Firing Mavericks while still over friendly territory and then turning after release to minimize the time across the FEBA this way, got four airplanes randomly attacking certain areas. You could work it in fifteen or twenty minutes, and then you need another four airplanes if you're going to keep the pressure on. Request air strikes for what you need, but here we're trying to guess what you might get. You talk about an hour battle and you might get sixteen F-4s. It's really high priority in the sector.

Author: We have just hit the end of the scenario. How would the Air Force come to our rescue? What do you think it would take in the way of response time once you are able to fly?

Major Goold: Figure fifteen minutes. You've got a critical situation, so you're talking about some airplanes enroute to targets somewhere else which are diverted in here.

Author: Does it make any difference to you about boundaries? Of course, they don't show up from the air.

Major Goold: No.

Author: So, the Air Force doesn't really use boundaries?

Major Goold: What we need to know is what visual terrain features differentiate friendly from enemy-held territory. This looks like a pretty easily describable hill line. You gotta be able to tell the pilot a visual cue of where the friendlies are; and you've got a tremendous ability to do that because everybody's in the tree lines. "Air Crew: as long as you drop past those tree lines you're in great shape. You see you've got two cities, two built-up areas out here. You'll see a mile and a half, to two and a half from the tree lines a couple of small villages and the road networks." What would the task force commander do at that time? He'd have his FAC out there with his Mark 108 pulled up here on a high terrain area. Should have some good visibility here. So when these air crews come in, he says, "Tally ho, guy, I see you. Your target is down at ten o'clock low." To an aircraft in a pop-up maneuver he might say, "Turn right, or east, or whatever." The FAC has got to be the positive control on the guy (pilot). He gets him into the general area and insures they don't drop bombs short of friendly positions. What they do in NATO, is put a great big panel out there behind your positions. It's about 150 feet long. Make a T with it and it shows you the heading to the target. It's in the back on a reverse slope of the hill. That's their concept. I don't know how long it takes for them to go out there and put the panels down, but it would take fifteen to thirty minutes to drive over there. He (FAC) puts those things out and marks the place.

ENDNOTES

ENDNOTES

CHAPTER I

[1]Opening Comments, Defense Conference III, U.S. Army Combined Arms Center, Ft. Leavenworth, KS., 25 February 1975.

[2]Comments, Defense Conference IV, U.S. Army Combined Arms Center, Ft. Leavenworth, KS., 25 March 1975.

[3]Forward Deployed Force Operations (European Setting), Lesson 3161, (Ft. Leavenworth, KS.: U.S. Army Command and General Staff College), August 1975, pp. 1-15.

[4]DePuy, GEN William E., and Rogers, GEN Bernard W., OFTCON II, Instructional Video Tape, October 1975, counter 400.

[5]ibid, counter 470.

[6]ibid, counter 390.

[7]Defense Conference IV, Defensive Plans, Inclosure 3, Division Commander's Concept (Ft. Leavenworth, KS: U.S. Army Command and General Staff College, March 1975), p. 3.

[8]The doctrine was approved by Cdr TRADOC in Aug 1975.

[9]A concern expressed by GEN DePuy at Ft. Leavenworth, KS, on 10 July 1975.

[10]Paper, subj: Lateral Boundaries, prepared by Doctrine Section, Department of Tactics, U.S. Army Command and General Staff College, Ft. Leavenworth, KS, 25 Nov 1975.

[11]U.S. Army, FM 7-20, The Infantry Battalions (Washington, D.C.: Headquarters, Department of the Army, Dec 1969), pp. 5-1 to 6-27.

[12]DePuy, GEN William E., and Rogers, GEN Bernard W., OFTCON II, Instructional Video Tape, October 1975, counter 515.

[13]ibid, counter 550.

[14]Notes, Defense Conference IV, (Ft. Leavenworth, KS: U.S. Army Command and General Staff College, 25 Mar 1975).

[15]Comment based on author's MPA course work in 1975 with Concentration in Organizational Behavior.

[16]DePuy, GEN William E., and Rogert, GEN Bernard W., OFTCON II, Instructional Video Tape, October 1975.

[17]U.S. Army, FM 71-100 (Draft), Division Operations (Mechanized and Armor), (Ft. Leavenworth, KS: Command and General Staff College, Jan 1976), Ch 3.

[18]ibid.

[19]ibid.

[20]DePuy, GEN William E., and Rogers, GEN Bernard W., OFTCON II, Instructional Video Tape, October 1975, counter 360.

CHAPTER II

[21]U.S. Army, TM 71-4-2, The Tank Mechanized Infantry Team (Washington, D.C.: Headquarters, Department of the Army, Oct 1974).

[22]U.S. Army, FM 101-5, Staff Officers Field Manual, Staff Organization and Procedure (Washington, D.C.: Headquarters, Department of the Army, July 1972) p. F-38.

[23]U.S. Army, FM 6-20, Field Artillery, Tactics and Operations (Washington, D.C.: Headquarters, Department of the Army, August 1973) pp. 6-12.

[24]U.S. Army, AR 351-1, Schools, Military Education and Training (Washington, D.C.: Department of the Army, January 1975) pp. 2-2 to 2-3.

[25]ibid.

[26]U.S. Army, FM 7-20, The Infantry Battalions (Washington, D.C.: Headquarters, Department of the Army, Dec 1969) pp. 5-29.

U.S. Army, FM 17-15, Tank Units Platoon, Company and Battalion (Washington, D.C.: Headquarters, Department of the Army, March 1966), pp. 122-125.

[27]U.S. Army, FM 7-20, The Infantry Battalions (Washington, D.C.: Headquarters, Department of the Army, Dec 1969), pp. 5-29.

BIBLIOGRAPHY

BIBLIOGRAPHY

Books

Addington, Larry H. The Blitzkrieg Era and the German General Staff 1865-1941. New Brunswick, N. J.: Rutgers University Press, 1971.

Bidwell, Shelford. Modern Warfare; A Study of Men, Weapons and Theories. London: Allen Lane, 1973.

Chuikov, Vasili I. The Battle for Stalingrad. New York: Ballantine, 1964.

Downey, Fairfax D. Cannonade: Great Artillery Actions of History. Garden City, N. Y.: Doubleday, 1966.

Halperin, Morton H. Defense Strategies for the Seventies. Boston: Little, Brown and Co., 1971.

Hart, B. H. Liddell (ed.). The Red Army. New York: Harcourt, Brace & Co., 1956.

Icks, Robert J. Famous Tank Battles. New York: Doubleday and Co., Inc., 1972.

Middleton, Drew. Can America Win the Next War? New York: Charles Scribner's Sons., 1975.

Middleton, Drew. The Defense of Western Europe. New York: Appleton-Century Crofts, 1952.

Savkin, V. YE. The Basic Principles of Operational Art and Tactics (A Soviet View). Translation. Washington: U.S. Government Printing Office, 1972.

Sidorenko, COL A. A. The Offensive (A Soviet View). Translation. Washington: U.S. Government Printing Office, 1973.

Stalingrad: An Eye-Witness Account by Soviet Correspondents and Red Army Commanders. London: Hutchinson, 1945.

Webster's New World Dictionary. Second College Edition. New York: World Publishing Company, 1970.

Yale, Wesley W. Alternative to Armageddon; the Price Potential of Lightning War. New Brunswick, N. J.: Rutgers University Press, 1970.

Government Documents

Comeyne, William G. Antitank Effectiveness of the U.S. Army Standard Minefield Pattern. Fort Belvoir, Virginia: U.S. Army Mobility Equipment Research and Development Center, April, 1970.

General Research Corporation. NATO Combat Capabilities (COMCAP) Analysis II (U). (Draft Client Report). McLean, VA: June 1973. (SECRET)

Historical Evaluation and Research Organization (HERO), Average Casualty Rules for Wargames Based on Historical Data. Arlington, VA: February 1967.

Ministry of Defense West Byfleet UK. Neutralising Effects of Bombardment. March 1972. (CONFIDENTIAL)

Research Analysis Corporation. NATO Combat Capabilities Study. Vol IV, June 1972.

US Army Combined Arms Center, SCORES Manual Wargaming Methodology (Coordination Draft) (U). October 1974. (CONFIDENTIAL)

_____. Standard Scenario for Combat Developments - Europe-I, Sequence 1, Vol 1-7, March 1975. (SECRET)

_____. Standard Scenario for Combat Developments - Europe-I, Sequence 2, Vol 1-3, March 1975. (SECRET)

_____. Standard Scenario for Combat Developments - Europe-I, Sequence 3, Vol 1, June 1975. (SECRET)

_____. Standard Scenario for Combat Developments - Europe-I, Sequence 4, Vol 1-4, June 1975. (SECRET)

_____. Standard Scenario for Combat Developments - Europe-I, Sequence 2A, Vol 1-5, October 1975. (SECRET)

U.S. Army Command and General Staff College. Selected Readings in Tactics - Forward Deployed Forces, Europe. Reference Book 100-2, Vol IV. Fort Leavenworth, May 1975.

U.S. Army Command and General Staff College. Selected Readings in Tactics - The 1973 Middle East War. Reference Book 100-2, Vol I. Fort Leavenworth, May 1975.

U.S. Department of the Army, Concepts Analysis Agency, Employment of Obstacles in Combat in Europe in World War II, Contract No. DAAG 39-74-C-0033, Historical Evaluation and Research Organization, Dunn Loring, Virginia, March 1974. (UNCLASSIFIED)

U.S. Department of the Army. Antitank Weapons Systems Requirements Study (ATMIX-INF) (U). U.S. Army Combat Developments Command Infantry Agency. Ft. Benning, GA: August 1970. (SECRET)

_____. FM 17-1. Armor Operations. Washington, D.C.: October 1966.

_____. FM 17-30. The Armored Brigade. Washington, D.C.: 16 Sep 1969.

_____. FM 17-36. Armored Cavalry Platoon, Troop, and Divisional Armored Cavalry Squadron. Washington, D.C.: 1 June 1973.

_____. FM 31-50, Combat in Fortified and Built-up Areas. Washington, D.C.: March 1964.

_____. FM 61-100. The Division. Washington, D.C.: November 1968.

_____. FM 5-34. Engineer Field Data. Washington, D.C.: December 1969.

_____. FM 5-25. Explosives and Demolitions. Washington, D.C.: February 1971.

_____. FM 6-20. Field Artillery Tactics and Operations. Washington, D.C.: 30 Aug 1973.

_____. FM 7-30. Infantry, Armor, and Mechanized Brigades. Washington, D.C.: March 1969.

_____. FM 30-40. Handbook on Soviet Ground Forces. Washington, D.C.: U.S. Government Printing Office, 1975.

_____. FM 7-20. The Infantry Battalions. Washington, D.C.: 8 December 1969.

_____. FM 7-30. The Infantry Brigades. Washington, D.C.: 28 March 1969.

U.S. Department of the Army. FM 20-32. Landmine Warfare. Washington, D.C.: January 1971.

_____. FM 105-5. Maneuver Control. Washington, D.C.: December 1973.

_____. FM 100-5 (draft). Operations. U.S. Army Command and General Staff College: Fort Leavenworth: October 1975.

_____. FM 7-10. The Rifle Company, Platoons, and Squads. Washington, D.C.: 17 April 1970.

_____. FM 23-3. Tactics, Techniques and Concepts of AntiArmor Warfare. Washington, D.C.: August 1972.

_____. FM 17-12. Tank Gunnery. Washington, D.C.: 10 November 1972.

_____. FM 17-15. Tank Units, Platoon, Company and Battalion. Washington, D.C.: 25 March 1966.

_____. FM 145-60. Theory and Dynamics of Tactical Operations. Washington, D.C.: 10 Mar 1972.

_____. FM 23-24. Dragon Medium Antitank Assault Weapon System M47. Washington, D.C.: 30 Aug 1974.

_____. FM 71-4-2. The Tank Mechanized Infantry Team. Washington, D.C.: 10 October 1974.

_____. FM 23-23. TOW Heavy Antitank Weapon System. Washington, D.C.: 9 July 1970.

_____. FM 17-15-1. Training a Tank Platoon and Tank Company in Battle Drill. Washington, D.C.: 1 October 1973.

U.S. Army Foreign Service and Technology Center. Stop the Tanks (Country: Czechoslovakia). Washington: November 1969.

U.S. Army Infantry School. Antiarmor Tactics and Techniques for Mechanized Infantry,(ST 23-2-1). Fort Benning, Georgia: 1974.

U.S. Army Intelligence School. Soviet Motorized Rifle Regiment. (Training Circular 30-4). Fort Huachuca, Arizona: June 1975.

U.S Army TRADOC, Reg 71-5, Scenario Oriented Recurring Evaluation System (SCORES). 14 February 1975.

U.S. Army Training and Doctrine Command. "Range and Lethality of US. Soviet Antiarmor Weapons." TRADOC Bulletin 1, September 1974.

_____. "Weapons, Tactics, Training, Soviet ATGMs: Capabilities and Countermeasures," TRADOC Bulletin 2, April 1975.

_____. "Weapons, Tactics, Training, Improving Combined Arms Combat Effectiveness Through Innovations in Field Artillery Tactics and Training," TRADOC Bulletin 7, October 1975.

Articles and Periodicals

Davison, Michael S. "In Europe, the Focus is on People." Army, October 1971.

Dunetz, Bryant A. "Tank Gun or Missile." Armor, March-April 1973.

Dunetz, Bryant A. and Dr. Ceslovas Masaitis. "Mobility and Survival." National Defense, January-February 1975.

Erickson, John. "Soviet Military Capabilities in Europe." RUSI/RMAS Research Centre for the Study of Soviet Affairs, March 1975, pp 65-68.

Faugere, H., Soldati, et al. "French Views of French and West German Armored Vehicles." Washington: U.S. Army Foreign Science and Technology Center, December 1970.

Graf von Kielmansegg, J.A. "A German View of Western Defense." Military Review. November 1974.

Huettel, Major I. G. Rolf A., Deutsch Bundeswehr. "Defense Against Armor in the German Army." Armor, September-October 1970.

Ivanov, COL V. "Combating Self-Propelled Artillery, Translation. Field Artillery Journal, January-February 1975, pp. 54-58.

Lewis, BG Vernon B., Jr. "Evolving Field Artillery Tactics and Techniques," Field Artillery Journal, January-February 1975, p. 39.

Murphy, Philip J. "Thesis on Future Military Design -- A Forecast of Combat Vehicle Systems." Warren, Michigan: U.S. Army Tank Automotive Command, Technical Report No. 11737, January 1973.

Ogorkiewicz, Richard M. "Antitank Weapons." Armor, May-June 1973.

Pavolvsky, G. A. Ivan. "The Main Fire and Striking Power," Soviet Military Review, February 1975, pp. 9-11.

Rula, A. A., C. A. Blackman, et al. "Relative Off-Road Mobility of MBT70 and M60A1E1 Tanks in Selected Terrain in West Germany." Vicksburg, Mississippi: U.S. Army Engineer Waterways Experimental Station, Technical Report M-70-10, July 1970.

Sidorenko, COL A. A. "The Offensive, a Glimpse of Modern Soviet Artillery Tactics," Translation from manuscript originally published in Russia. Field Artillery Journal, July-August 1974, pp. 35-45.

Starry, Major General Donn A. "Observations of the Tank-Antitank Battlefield." Armor, January-February 1974.

Tarpley, Thomas M. "Airmobility in Mid-intensity Warfare." U.S. Army Aviation Digest. July 1974.

Wood, William J. "Can the Artillery Survive?" Field Artillery Journal, October-November 1973, pp. 5-10.

Other Sources

DePuy, GEN William E. Address at OPTCON Officers Training Conference, Fort Hood, Texas, 7 October 1975. Video tape available at U.S. Army Command and General Staff College.

The Johns Hopkins University, Operations Research Office. Limitations Imposed by Topography on Line-of-Sight Surveillance and Communication. Chevy Chase, 1955.

Unpublished Material

Latuekin, A., COL Soviet Army, "Antitank Weapons", translation from an article in Red Star, 4 December 1975.

U.S. Army Command and General Staff College, Lesson 3161, Forward Deployed Force Operations (European Setting), Ft Leavenworth, Kansas, August 1975.

_____. FM 71-100 (draft), The Heavy Division, Ft. Leavenworth, Kansas: January 1976.

U.S. Army Command and General Staff College, Concept Paper, "Emerging Antiarmor Doctrine" Ft Leavenworth, Kansas: May 1975.

_____. Letters from USATRADOC, USACGSC, USAARMS, USAIS; Subject: Boundaries and Antiarmor Doctrine. Ft Leavenworth, Kansas, November 1975.